

Unit 2 Test – Polynomial and Rational Functions

PRACTICE TEST

Multiple Choice

Identify the choice that best completes the statement or answers the question.

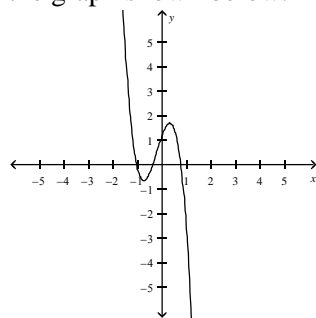
_____ 1. If the leading coefficient of an odd-degree polynomial function is positive, then the function extends from the third quadrant to the first quadrant; that is, as

- a. $x \rightarrow \infty, y \rightarrow -\infty$ and as $x \rightarrow -\infty, y \rightarrow \infty$
- b. $x \rightarrow -\infty, y \rightarrow \infty$ and as $x \rightarrow \infty, y \rightarrow -\infty$
- c. $x \rightarrow -\infty, y \rightarrow -\infty$ and as $x \rightarrow \infty, y \rightarrow \infty$
- d. $x \rightarrow -\infty, y \rightarrow -\infty$ and as $x \rightarrow \infty, y \rightarrow -\infty$

_____ 2. What is the degree and lead coefficient of $f(x) = -x + 5x^2 - 6x^3 + 10$?

- a. degree 1 with a lead coefficient of -1
- b. degree 3 with a lead coefficient of -1
- c. degree 3 with a lead coefficient of -6
- d. degree 6 with a lead coefficient of -1

_____ 3. Using end behaviours, turning points, and zeros, determine the polynomial equation that represents the graph shown below.



- a. $g(x) = -4x^2 + 3x + 1$
- b. $g(x) = -4x^4 - 3x^3 - 2x^2 + 3x + 1$
- c. $g(x) = 4x^3 - 2x^2 + 3x + 1$
- d. $g(x) = -4x^3 - 2x^2 + 3x + 1$

_____ 4. What is the maximum number of turning points that the polynomial function $f(x) = 4x^7 + 9x^5 - 3x^4 + 2x^2 - 5$ can have?

- a. 0
- b. 2
- c. 3
- d. 6

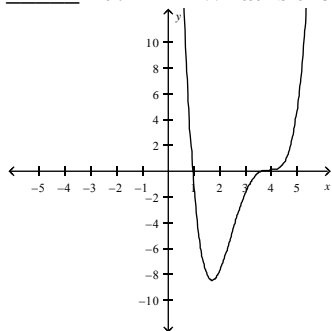
_____ 5. If any of the linear factors of a polynomial function are squared, then which of the following is not true of the corresponding x -intercepts?

- a. The x -intercepts are turning points of the curve.
- b. The x -axis is tangent to the curve at these points.
- c. The graph passes through the x -axis at these points.
- d. The graph has a parabolic shape near these x -intercepts.

_____ 6. Which one of the following functions has $x + 1$ as a factor?

- a. $f(x) = x^3 - 2x^2 + x - 3$
- b. $g(x) = x^2 - 3x + 1$
- c. $h(x) = x^5 - x^4 - 2x^3 + 8x^2 - 6x$
- d. $j(x) = x^5 + x^4 - 2x^3 + 4x^2 + 6x$

_____ 7. What is the equation of the graph shown below?



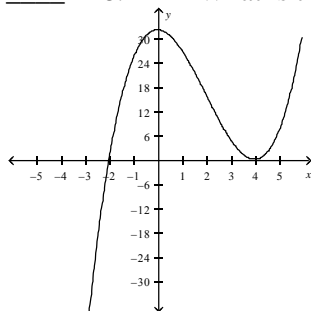
a. $f(x) = (x-4)(x-1)$

c. $f(x) = (x+4)^3(x+1)$

b. $f(x) = (x-4)^2(x-1)$

d. $f(x) = (x-4)^3(x-1)$

_____ 8. What is the equation of the graph shown below?



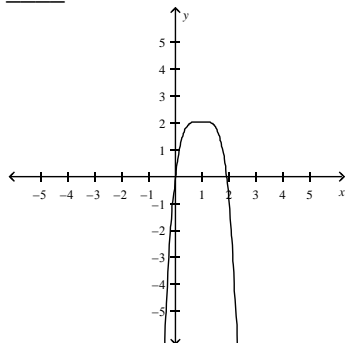
a. $f(x) = (x-4)(x+2)$

c. $f(x) = (x-4)^2(x+2)$

b. $f(x) = x(x-4)(x+2)$

d. $f(x) = (x+4)^2(x+2)$

_____ 9. Determine which function represents the graph shown below without graphing the function.



a. $y = 2.5(x-1)^3 + 2$

c. $y = 2.5(x-1)^4 + 2$

b. $y = -2.5(x-1)^3 + 2$

d. $y = -2.5(x-1)^4 + 2$

_____ 10. Which of the following is a partially factored form of the function $f(x) = x^3 + 5x^2 - 2x - 24$?

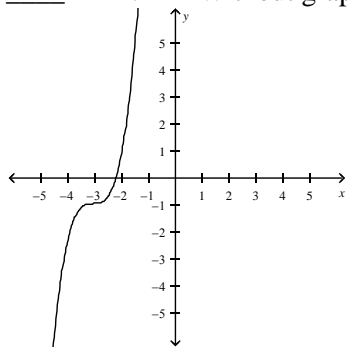
a. $f(x) = (x-2)(x^2 - 7x + 12)$

c. $f(x) = (x+2)(x^2 + 3x - 16)$

b. $f(x) = (x+3)(x^2 + 2x + 8)$

d. $f(x) = (x+3)(x^2 + 2x - 8)$

_____ 12. Without graphing, determine which function represents the graph shown below.

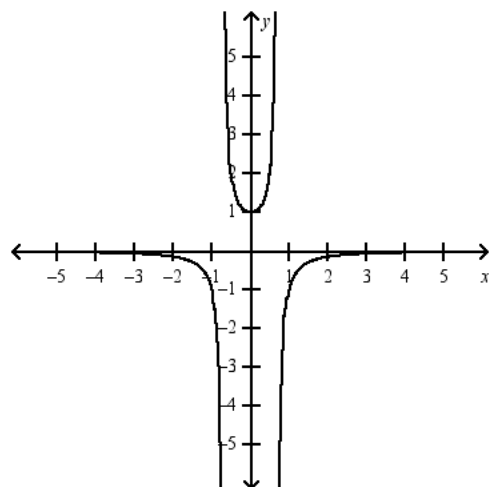


- a. $y = 1.6(x + 3)^3 - 1$ b. $y = 1.6(x + 3)^4 - 1$ c. $y = -1.6(x + 3)^3 - 1$ d. $y = -1.6(x + 3)^4 - 1$

16.) Calculate $(6x^4 - 6x^3 + 5x^2 - 12x + 1) \div (x + 2)$ using synthetic division. Give the division statement.

17.) $6x^4 + nx^3 - 14x^2 + 2$ is divided by $2x + 1$. The remainder is -2 . Find the value of n . Justify your answer by showing your work.

19.) Find the equation of the following graph given that it is a reciprocal function. [4T]



20.) An open box is made from a rectangular piece of cardboard with dimensions 12 cm by 15 cm, by cutting congruent squares from each corner and folding up the sides. Determine all possible dimensions of the squares to be cut to create a volume of 162 cubic cm.

Compare and contrast polynomial and rational functions.

State and explain 2 places in your daily life where you may see polynomial or rational functions.